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I, JONNE YABSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2002953027 for a patent by INOVEC PTY LTD as filed on 29 November 2002.



WITNESS my hand this  
Nineteenth day of December 2003

A handwritten signature in cursive script, reading 'J Yabsley'.

JONNE YABSLEY  
TEAM LEADER EXAMINATION  
SUPPORT AND SALES

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## **Field of the Invention**

This invention is directed to an electronic door lock arrangement, particularly to an electronic door lock arrangement of the type including two separate drive means wherein both drive means are able to drive the lock.

## **Background of the Invention**

Traditionally secure locking systems such as deadbolts have been operated and controlled manually. However, the use of electronic systems for the control and operation of locks is becoming increasingly common.

The present invention is directed to an arrangement that allows independent electronic or manual control of the lock operation.

An advantage of this arrangement is that either drive may drive the lock independently without prohibiting the operation of the other. For example, a key may be used to lock a lock and a remote control may be used to then unlock the lock or vice versa.

This provides significant advantage where a key or remote control may be used equally by numerous persons to access a lock in a door to either lock or unlock the door in situations of power failure to the lock, electric motor drive failure or individual remote failure.

## **Summary of the Invention**

Accordingly there is proposed in one form of the invention, which is not intended to be necessarily the only, or indeed the broadest form of this, a lock arrangement for a closure member including a lock, which comprises:

- a slider body including a demountable arm,
- a lock bolt that cooperates with said slider body to lock and unlock said lock,
- a first drive means adapted to engage and move said slider body between at least a first and second positions, said lock locked when said slider body is in the first position and unlocked when said slider body is in the second position;
- a second drive means adapted to engage said demountable arm and move said slider body between at least said first and said second positions when said arm is mounted to said slider body;

Wherein when said first drive means operates, said demountable arm is caused to demount from said slider body preventing said second drive means from moving said slider body, said slider arm remaining disengaged whilst said first drive means is driving and upon cessation of driving of said first drive means, said slider arm is automatically re-coupled to said slider body upon operation of said second drive means.

In preference the first drive means is a key that is inserted into the lock to drive a cam.

In preference the second drive means is an electric motor.

In preference the slider body is made up of two main parts, a slider and a rack.

In preference the slider and rack contain a cavity containing a two-part plunger, which is biased to a first position whereby the slider and rack cavities are aligned and the slider and the rack are connected.

In preference the two-part plunger is moveable to a second position whereby the plunger splits into two parts allowing the slider and rack to be disconnected.

In preference the slider body further contains a carriage.

In preference said plunger is depressed when the key cam applies a force to said carriage.

In preference said key cam is captive in said carriage upon installation of the lock in a door.

In preference the lock has a case for containing the slider body said slider body being slidably supported for movement between an unlocked and locked position. The lock case further contains a lock bolt slidably supported for movement between an extended locked position and a retracted unlocked position in a direction perpendicular to the movement of the slider body.

In preference the slider is operatively connected to the bolt to move it between said extended locked position and said retracted unlocked position.

For a better understanding of this invention it will now be described in relation to preferred embodiments which shall be described with the assistance of drawings wherein:

Figure 1 is a side view of the preferred embodiment illustrating the lock after being unlocked by the electric motor.

Figure 2 is a side view of the preferred embodiment showing the lock after being locked by the electric motor..

Figure 3 is an exploded view of the preferred embodiment of the rack and slider.

Figure 4 is a further exploded view of the preferred embodiment of the rack and slider.

Figure 5 is a side view of the preferred embodiment of the rack and slider after the lock has been unlocked with a key.

Figure 6 is a side view of the preferred embodiment of the rack and slider after the lock has been locked with a key.

Figure 7 is a side view of the preferred embodiment of the rack and slider illustrating the plunger and carriage.

Figure 8 is a side view illustrating the arrangement of the plunger, the carriage and key cam for the preferred embodiment of the invention.

Figure 9 is a side view of the preferred embodiment of the rack and slider showing the disconnection of the rack from the slider by depressing of the plunger with the lock cam.

#### **Description of the arrangement of the preferred embodiment**

Referring to figure 1 there is illustrated a lock 18 with a lock bolt 13 slidably mounted in a lock case 19 and operatively coupled to a slider 2. The slider 2 is slidably mounted in the lock case 19. Movement of the slider 2 in the direction of arrow 20, causes lock bolt 13 to move in the direction of arrow 22.

Correspondingly, movement of the slider in the direction of arrow 21 causes the lock bolt 13 to move in the direction of arrow 23.

The slider is moveable in the directions of arrows 20 and 21 by use of a key (not shown), which acts on a cam 11.

The slider is also moveable in the directions of arrows 20 and 21 by an electric motor (not shown) acting on a rack 1. The electric motor (not shown) has a pinion (also not shown), which drives the rack by meshing with rack teeth 24.

Figures 1 and 2 illustrate the operation of the lock 18 by the electric motor through a cycle starting from the unlocked position to the locked position. During this cycle the electric motor drives the rack and slider in the direction of arrow 20. The slider drives the lock bolt 13 towards arrow 22 to the locked position shown in figure 2.

Throughout this cycle, the cam 11 follows the slider 2 movement being captive within a carriage 6.

The cam 11 is free moving and follows the carriage 6.

A biased member 12 holds the slider in the locked position by indexing with a recess in a lid (not shown) on the lock.

Figures 3 and 4 illustrate a pin 4 that sits in a rack cavity 17. The pin 4 has a recess 16 for containing a spring 25. A cap 5 sits in a slider aperture 8 with a taper 15 protruding into a carriage pocket 9. Cam 11 indexes with a carriage aperture 14.

The slider 2 is sandwiched together by the carriage 6 and the rack 1. A shoulder 24 in the lock case 19 keeps these components sandwiched together.

Figures 5 through to 9 illustrate the operation of the lock 18 by the cam 11 through a cycle beginning at the unlocked position of the lock 18 through to the locked position of the lock 18.

In figure 5 a key (not shown) is inserted in the key cylinder 7 to unlock the lock 18. In figure 6 a key is also used to lock the lock 18.

Figure 7 shows in more detail the slider 2 and rack 1 with the pin 4 forced into the slider aperture 8 by the spring 2. The pin in turn forces the cap 5 into the carriage pocket 9 where it is prevented from travelling further as the cap 5 abuts the ceiling 28 of the carriage pocket 9. This protrusion of the pin into the slider aperture 8 abuts slider shoulders 26 and 27.

#### **Description of the operation of the preferred embodiment**

On operation of the electric motor to lock the lock 18, the rack 1 moves the pin 4 in the direction of arrow 20, which then acts, on shoulder 26 to move the slider 2 to the locked position. On operation of the electric motor to unlock the lock 18, the rack 1 moves the pin 4 in the direction of arrow 21, which then acts, on shoulder 27 to move the slider 2 to the unlocked position.

On operation of a key to lock the lock 18, the cam 11 moves the carriage 6 in the direction of arrow 20 to abut taper 15 on the cap 5. Continued movement of the carriage 6 forces the

cap 5 downward against spring 25 tension until an intersection 29 between the cap 5 and pin 4 aligns with an intersection point 30 of the slider 2 and the rack 1 effectively removing shoulders 27 and 28 to form a shear plane 31 illustrated in figure 8.

Continued force on the key causes the pin to split into its component parts effectively disconnecting the rack 1 from the slider 2. The slider 2 can now be moved independently of the rack 1 by the key to lock or unlock the lock.

During operation of the cam 11 on the slider 2, the rack 1 is held in place by the gearing of the high torque electric motor (not shown) which prevents pinion (not shown) back movement. This allows sufficient force to be applied to the slider to overcome spring 25 tension and effect a disconnection of the rack 1 from the slider 2 without movement of the slider 2 away from the cam 11.

Upon cessation of force on the key or removal of the key from the lock 18, the electric motor if operated will drive the rack 1 until the rack cavity 17 and slider aperture 8 are aligned whereby the spring 25 forces the pin 4 back into abutment with the slider aperture 8. The slider 2 and rack 1 are now re coupled for the electric motor to drive the lock 18

Finally, it is to be understood that various alterations, modifications and/or additions may be introduced into the constructions and arrangements of the parts previously described without departing from the spirit or the ambit of the invention.

Dated this 26<sup>th</sup> day of November 2002

Kym Keightley

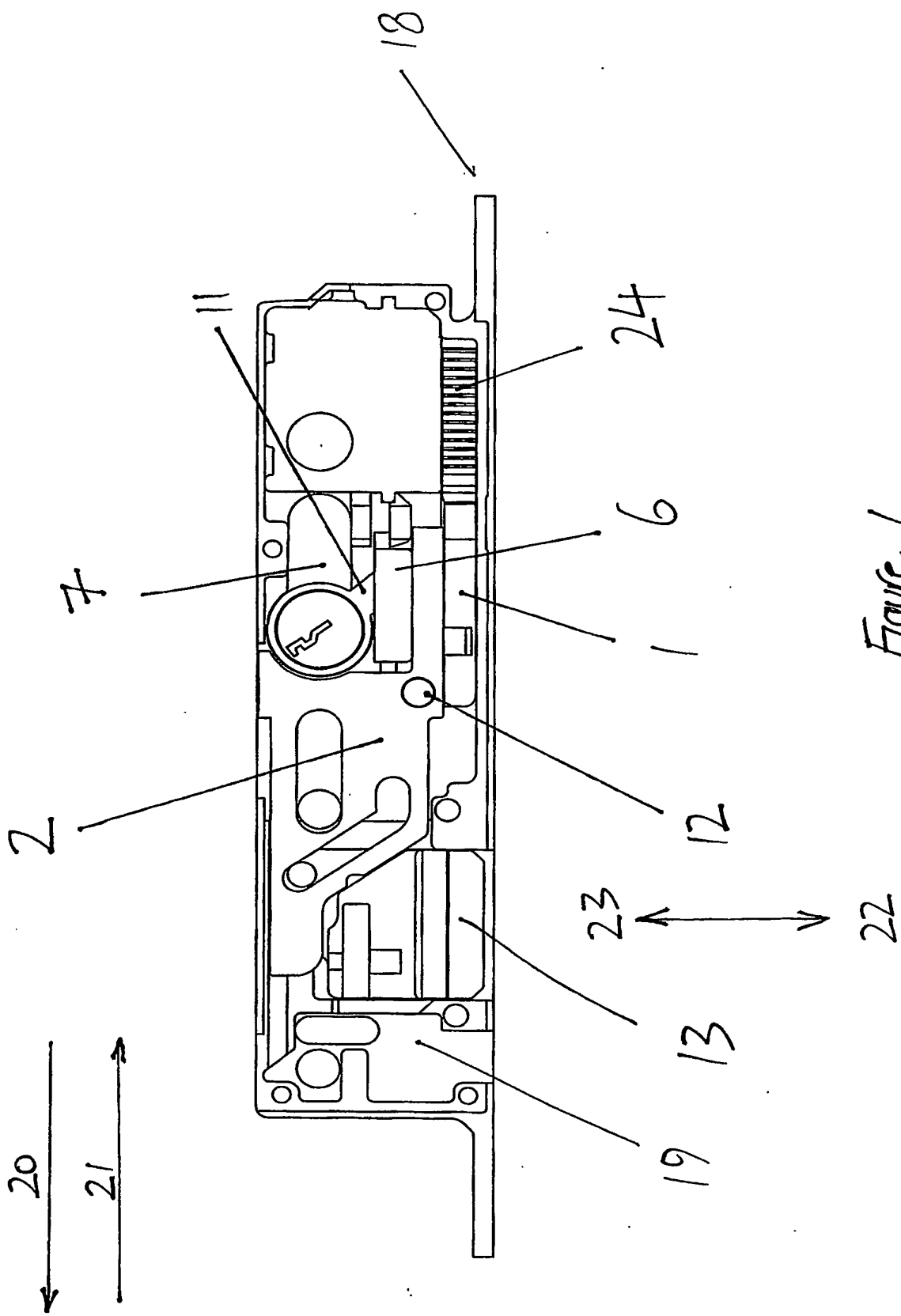


Figure 1

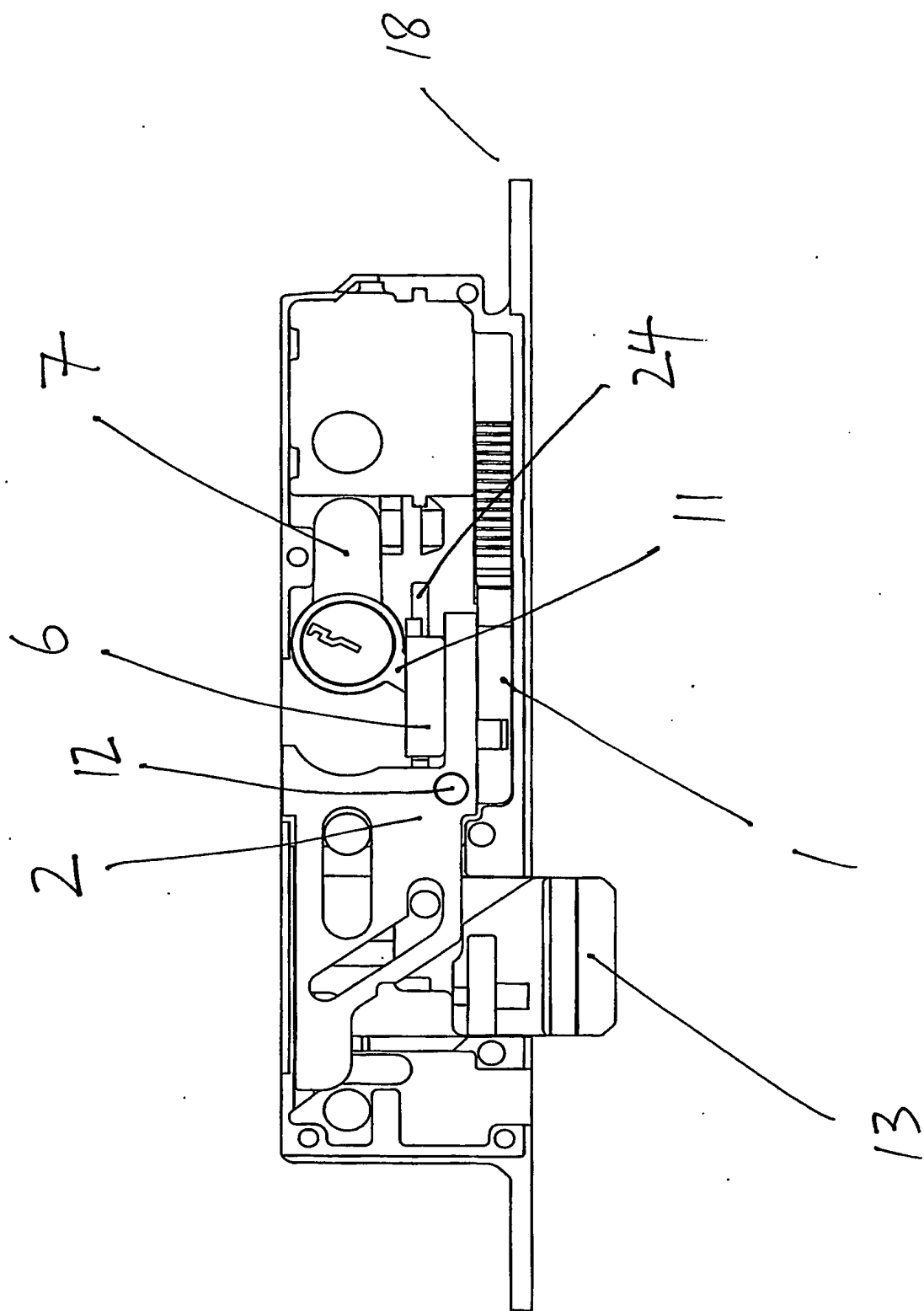


Figure 2

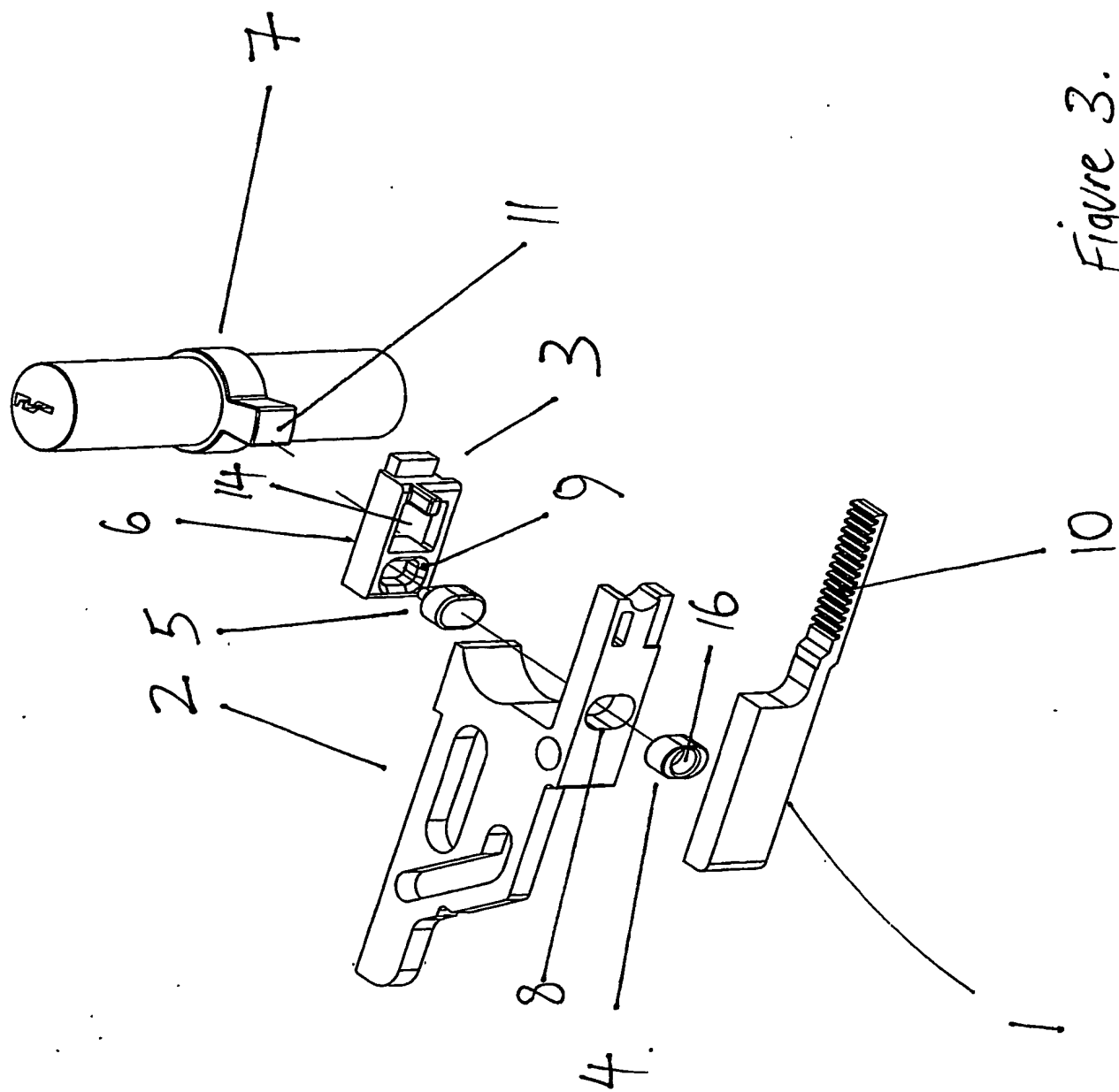


Figure 3.



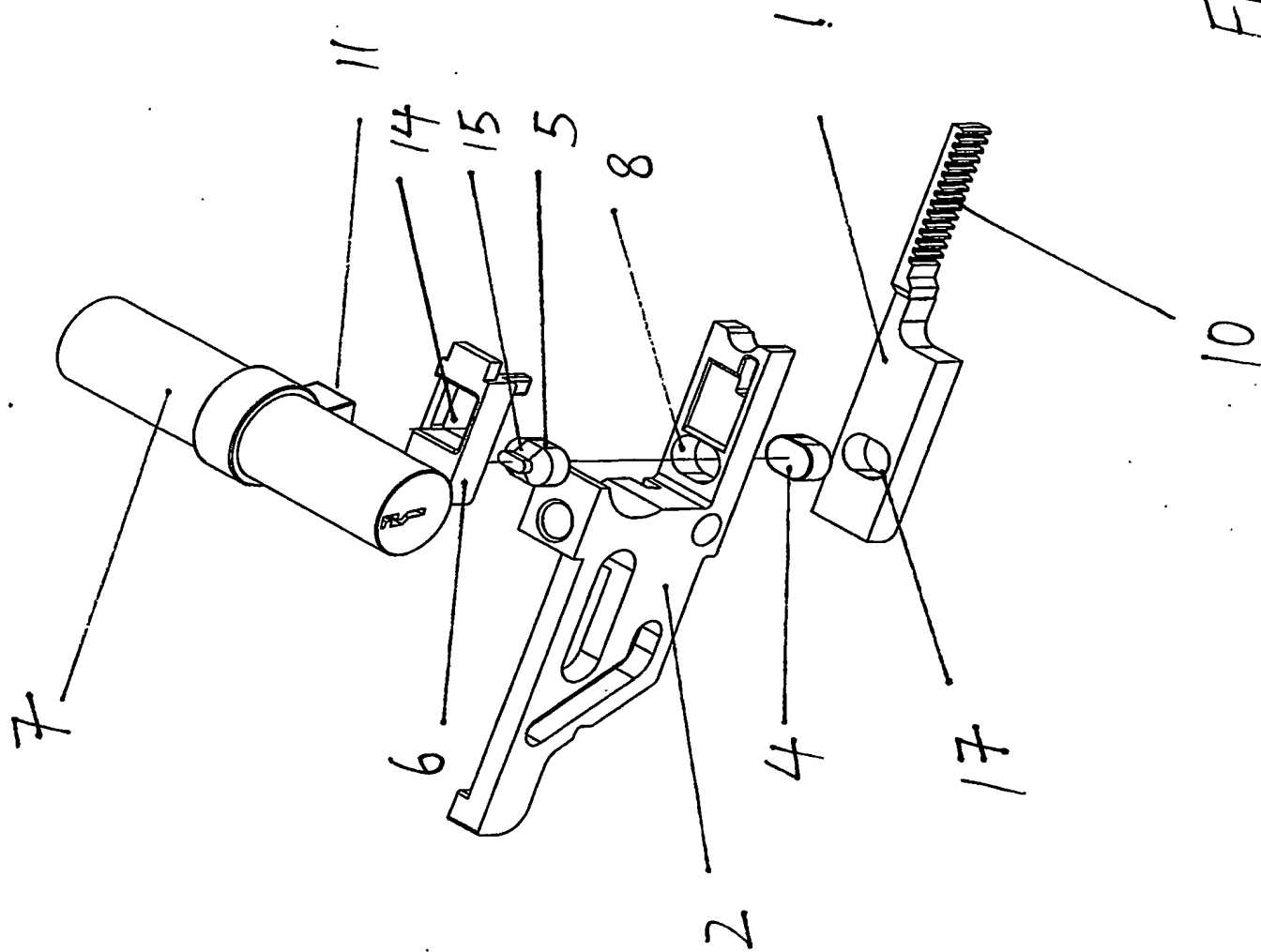


Figure 4

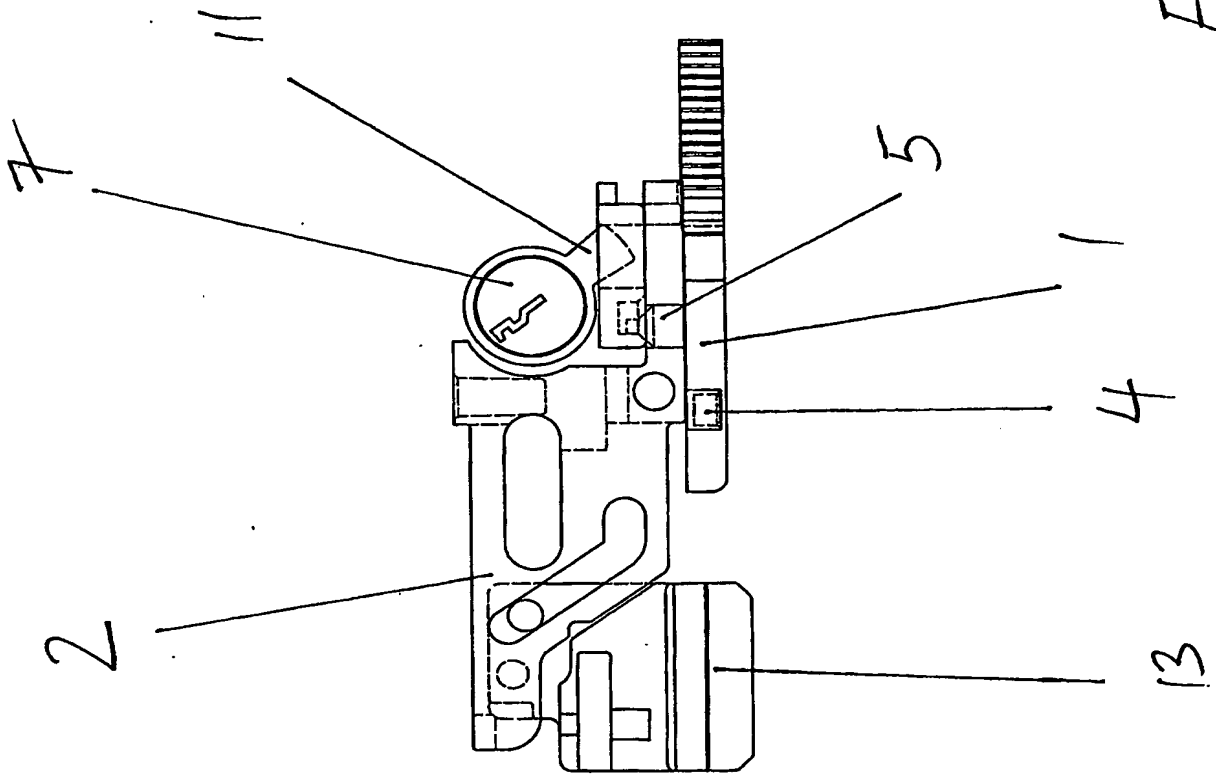


Figure 5

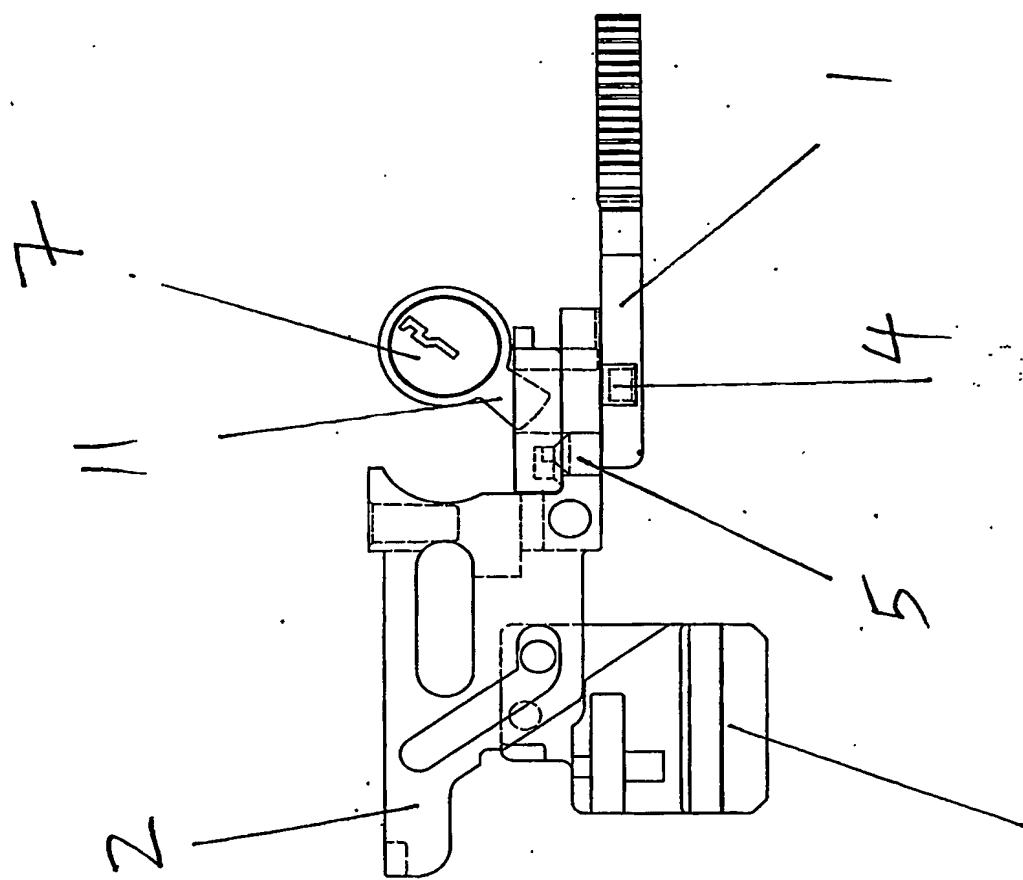


Figure 6

13

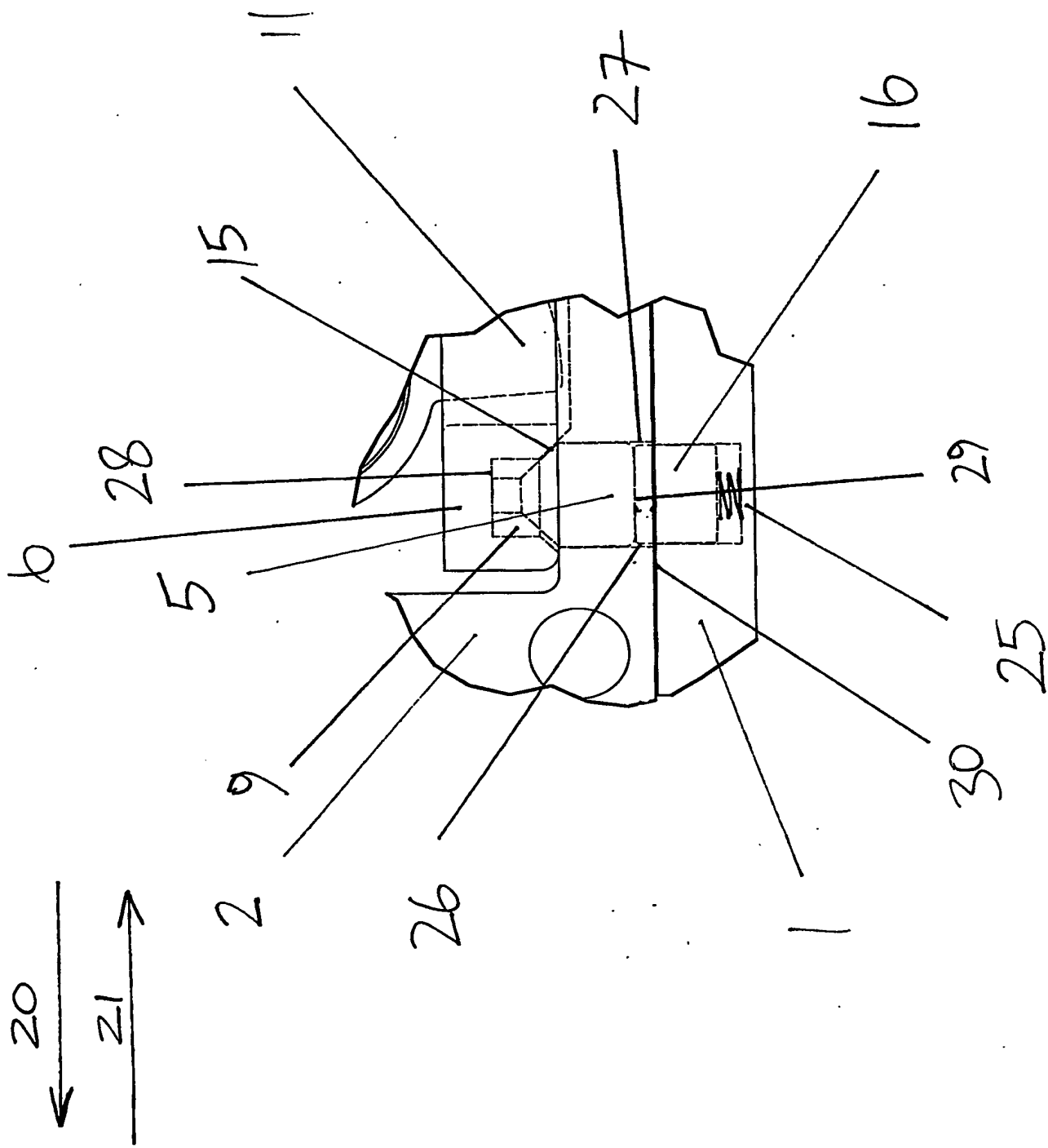


Figure 7

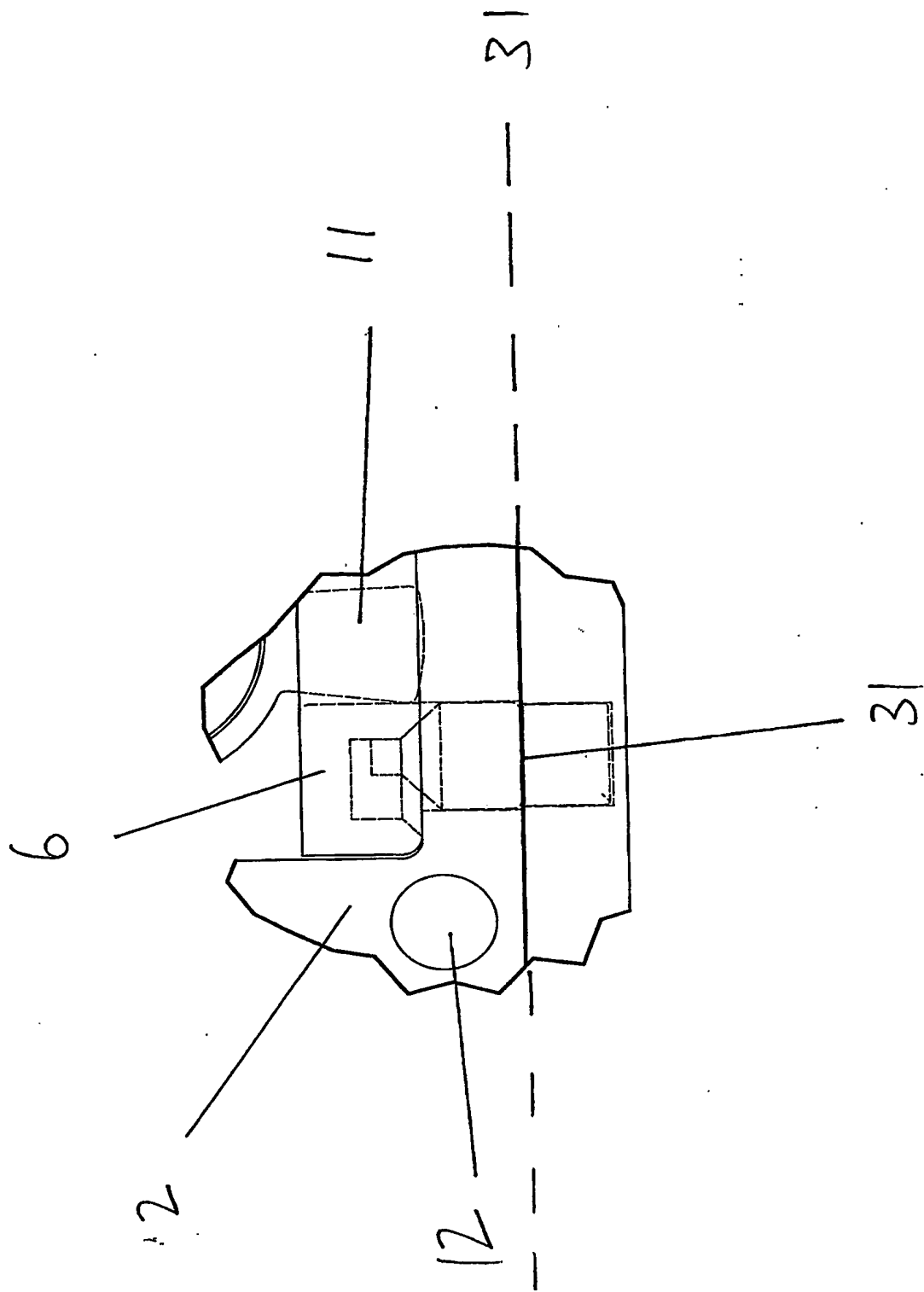


Figure 8

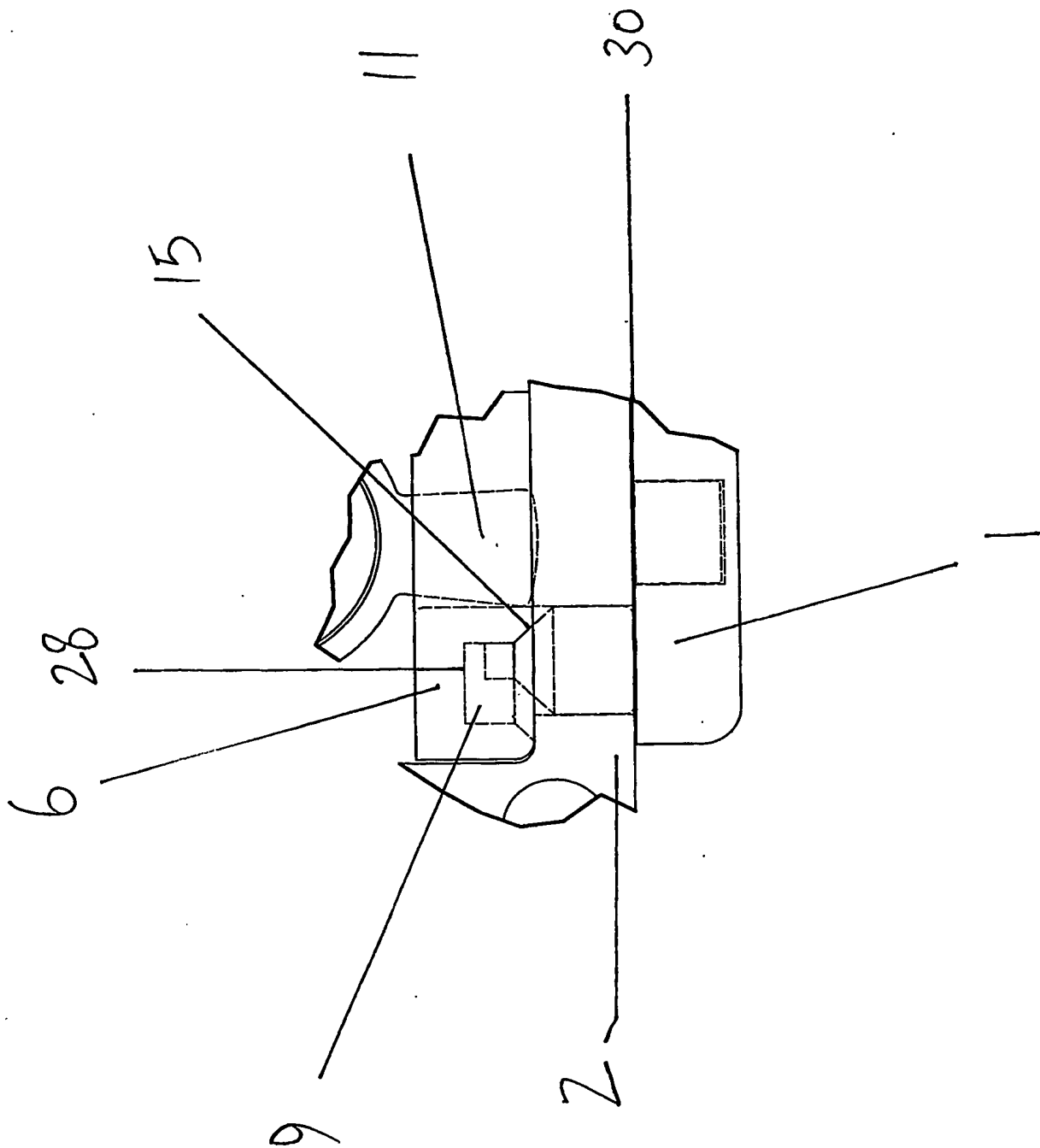


Figure 9